PATENT APPLICATION

of

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for a

A SYSTEM FOR RENDERING MULTIMEDIA MESSAGES BY PROVIDING, IN A MULTIMEDIA MESSAGE, URL FOR DOWNLOADABLE SOFTWARE TO A RECEIVING TERMINAL

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Field of the Invention

5   The invention relates to adaptation of multimedia messages by a multimedia messaging service center (MMSC) and more specifically providing the MMSC that enables a receiving terminal to render multimedia messages in generally unsupported formats.

Background of the Invention

10   A problem in multimedia messaging services is that terminals have very different capabilities (supported media formats, maximum image resolution, maximum message size, etc.). This creates interoperability problems. To reduce this problem, multimedia messaging service centers (MMSC) can adapt messages to the specific terminal capabilities. These capabilities are obtained through UAProf or

15   deduced from HTTP/WSP headers such as a User Agent header (UAHEADER) and Accept headers. However, there are cases where the MMSC cannot adapt without significantly deteriorating the quality of the content or it does not have the functionality to do so. An example of the first case is converting a video clip to an image (e.g. extracting the first frame of the video clip). An example of the second

20   case is if the message contains an image in PNG format (not supported by the receiving terminal) and the MMSC cannot convert PNG to an image format supported by the terminal (e.g. converting PNG to GIF). In these cases, user experience is drastically reduced.

          In the current state of the art, the MMSC tries its best to adapt each media

25   component to a format that is supported by the terminal (based on the reported capabilities). However, the MMSC transcoding capabilities may be limited only to a small set of formats. For example, the Nokia MMSC can convert GIF to JPEG and video to JPEG but those are about the only image format conversions supported so far. When the message quality is reduced too much, the message can also be

30   forwarded to an e-mail address or legacy terminal support (some Web server for messages). Nevertheless usability is significantly reduced at a receiving terminal (e.g.

when converting a video clip to a single image). For many other formats (PNG, PBM, etc.), the MMSC cannot perform the adaptation at all. Those components are still sent to the terminal if they fit within the multimedia messaging service message size restriction, but they may be unusable on the terminal side.

5   Thus, it is desirable to increase interoperability between terminals by providing an easy way for terminals to render originally unsupported components of the multimedia messages. It is also desirable to improve the user experience by providing easy assurance that messages can be adapted and to avoid cases where the MMSC just sending an unsupported component (with which the terminal doesn't know what to

10   do) or dropping it. It is further desirable to increase performance of already deployed mobile phones.

Summary of the Invention

The object of the present invention is to provide a system for rendering multimedia messages by providing a terminal-specific uniform resource locator

15   (URL) for downloadable software to a receiving terminal.

According to a first aspect of the present invention, a method for rendering multimedia messages comprises the steps of: providing a multimedia messaging service signal incorporating a further multimedia message signal (FMMS) indicative of a multimedia message and a terminal-specific uniform resource locator (URL)

20   signal from a multimedia messaging service center to a receiving terminal, said URL signal providing an Internet server location of software obtainable by the receiving terminal; and providing the software to the receiving terminal for rendering the multimedia message by the receiving terminal.

In further accord with the first aspect of the invention, the software is provided

25   to the receiving terminal in response to a software request signal sent by the receiving terminal to the Internet server location provided by the URL signal; wherein the software request signal may be sent by the receiving terminal to the Internet server location provided by the URL signal automatically after receiving the multimedia messaging service signal incorporating the URL signal, or the software request signal

30   may be sent by the receiving terminal to the Internet server location provided by the URL signal only after receiving a software request command from a user.

Still further according to the first aspect of the invention, after the step of providing the multimedia messaging service signal, the method further comprises the step of deciding whether additional software is needed to be installed in the receiving terminal for rendering originally unsupported components of a multimedia message

5 signal by the receiving terminal; wherein said decision may be made by the user or said decision may be made automatically by the receiving terminal.

Further still according to the first aspect of the invention, the method further comprises the step of rendering the further multimedia message signal indicative of the multimedia message by the receiving terminal, so that the multimedia message is

10 perceptible by a user.

In further accordance with the first aspect of the invention, prior to the step of providing the multimedia messaging service signal, the method further comprises the step of receiving and optionally storing the multimedia message signal by the multimedia messaging service center.

15 Yet further still according to the first aspect of the invention, the method further comprises an optional step of providing a message notification signal to the receiving terminal by the multimedia messaging service center.

According further to the first aspect of the invention, the method further comprises the step of providing a message retrieval request signal containing a

20 terminal signal indicative of a terminal information and optionally a multipurpose internet mail extension (MIME) signal indicative of a terminal-specific MIME information to the multimedia messaging service center by the receiving terminal. Further, the message retrieval request signal may be sent in response to the message notification signal. Still further, the MIME information may be deduced by the

25 multimedia messaging service center from the terminal information contained in the message retrieval request signal and from a software release information. Also further, a terminal signal indicative of a terminal information may be provided to the multimedia messaging service center during a registration process of a particular application, wherein the particular application may be a session initiation protocol

30 (SIP) instant messaging or a SIP messaging session. Still also further, a terminal-specific multipurpose internet mail extension (MIME) information may be deduced

by the multimedia messaging service center from the terminal information and from a software release information.

According still further to the first aspect of the invention, the method further comprises the step of evaluating by the multimedia messaging service center whether

5   it is appropriate to adapt unsupported components of the MMS to meet the capabilities of the receiving terminal and identifying the URLs for terminal-specific additional software to render the unsupported components of the multimedia message signal based on the terminal and MIME signals using a database of the multimedia messaging service center.

10   According still further to the first aspect of the invention, the method further comprises the step adapting by the multimedia messaging service center the appropriate unsupported components of the MMS to meet the capabilities of the receiving terminal.

According to a second aspect of the invention, a system comprises a

15   multimedia messaging service center, for providing a multimedia message service signal incorporating a further multimedia message signal indicative of a multimedia message and a terminal-specific uniform resource locator (URL) signal, said URL signal providing an internet location of downloadable software; and a receiving terminal responsive to the multimedia message service signal, for obtaining said

20   software for rendering the multimedia message.

According further to the second aspect of the invention, the multimedia messaging service center is further responsive to a multimedia message signal indicative of the multimedia message and to a message retrieval request signal containing a terminal signal indicative of a terminal information and optionally a

25   multipurpose internet mail extensions (MIME) signal indicative of a terminal-specific MIME information. Also, the multimedia messaging service center may further provide a message notification signal to the receiving terminal.

Further according to the second aspect of the invention, the receiving terminal is further responsive to a software request command by a user, provides a message

30   retrieval request signal containing a terminal signal indicative of a terminal information and optionally a multipurpose internet mail extensions (MIME) signal indicative of a terminal-specific MIME information, provides a software request

signal to an Internet server, provides a URL image signal to the user, and renders the further multimedia message signal indicative of the multimedia message perceptible by the user. Also, the receiving terminal may be responsive to a message notification signal.

5   Still further according to the second aspect of the invention, the system further comprises a sending terminal, for providing a multimedia message signal to the multimedia messaging service center.

According to a third aspect of the invention, a multimedia messaging service center comprises a database for identifying uniform resource locators (URLs) of

10   terminal-specific downloadable software; and means for providing a multimedia message service signal to a receiving terminal, incorporating a further multimedia message signal (FMMS) indicative of a multimedia message and a URL signal, said URL signal providing an internet server location of the terminal-specific downloadable software for rendering unsupported components of the FMMS by the

15   receiving terminal.

According to a fourth aspect of the invention, a receiving terminal, comprises means responsive to the multimedia message service signal, incorporating a further multimedia message signal (FMMS) indicative of a multimedia message and a terminal-specific uniform resource locator (URL) signal, said URL signal providing

20   an Internet server location of software obtainable by the receiving terminal; and means for sending a software request signal to the Internet server location provided by the URL signal.

Brief Description of the Drawings

For a fuller understanding of the nature and objects of the present invention,

25   reference is made to the following detailed description taken in conjunction with the following drawings, in which:

Figure 1 is a block diagram representing a system configuration, according to the present invention.

Figure 2 is a flow chart illustrating a system performance, according to the

30   present invention.

Best Mode for Carrying Out the Invention

This invention is about having a multimedia messaging service center (MMSC) providing to a receiving terminal, in an adapted multimedia messaging service signal (MMSS), a uniform resource locator (URL) signal indicative of where
5   to obtain media handling/decoding software that allows the receiving terminal to support the media content in the MMSS. The MMSC provides the URLs that are specific to the receiving terminal based on the terminal capabilities received (i.e. based on the terminal model and software release for instance) and possibly the multipurpose internet mail extension (MIME) types of originally unsupported
10   components. For example, the video decoding software are different for a Nokia phone and an Ericsson phone, therefore, the URLs for these two phones are different. URL information is embedded in the MMSS and inserted during the message adaptation processing. For that, the MMSC needs to have a database associating the URLs with media formats (MIME types) and phone types. Having these URLs, the
15   user goes to those locations, downloads and installs the software, and finally renders the message components in the message that it previously could not handle.

Figure 1 is a block diagram representing a system configuration, according to the present invention. A sending terminal 10 sends a multimedia message signal (MMS) 12 indicative of a multimedia message (MM) to a multimedia messaging
20   service center (MMSC) 14. In the present invention, the multimedia message has a broad interpretation including, but not limited to, traditional multimedia messages (combination of multiple forms of media in the communication of information such as audio, video, text, graphics, etc), the Multimedia Messaging Service defined in Open Mobile Alliance (OMA), in 3GPP and 3GPP2, e-mails, instant messages (such but not
25   limited to IETF SIMPLE, Wireless Village, OMA Instant Messaging and Presence Services (IMPS)), etc. In an extreme case, the multimedia message can be a response to a request to a Web server. Similarly, the MMSC has a broad interpretation including, but not limited to, an MMSC defined in OMA/3GPP Multimedia Messaging Service, an e-mail server, servers and proxies for Instant Messages, and
30   Web servers.

The MMSC 14 receives the MMS 12 and can store it. MMSC 14 may provide a message notification signal 16 to a receiving terminal (RT) 22 (such as a mobile telephone, a personal digital assistant or a computer) which notifies the receiving

terminal **22** and optionally a user **24** about the multimedia message. In certain instances (for example, e-mail) the MMSC **14** will not provide the message notification signal **16** to the receiving terminal **22** and therefore sending the message notification signal **16** is generally optional. In the case of e-mail, the terminal **22** or

5   the user **24** typically verifies periodically for new messages at the MMSC **14**. The receiving terminal **22** provides a message retrieval request signal (MRRS) **18** to the MMSC **14**. The MRRS **18** could be in response to the message notification signal **16** or it could be a stand-alone request, for example, for e-mail messages. The MRRS **18** contains information about capabilities of the receiving terminal **22** (e.g. based on the

10   terminal model and software release, UAProf or other means) and possibly multipurpose internet mail extension (MIME) types for the describing the supported media components. Note that if the MIME types are not provided, they often can be deduced from the terminal model and software release by the MMSC **14**. The MMSC **14** evaluates the content of the MMS **12** vs. the receiving terminal **22** and MIME

15   information to determine whether each component of the multimedia message is supported by the receiving terminal **22** and if additional software in the receiving terminal **22** is required for rendering the originally unsupported components of the MMS **12**.

If the receiving terminal **22** fully supports all of the components of the MMS

20   **12**, the MMSC **14** sends a multimedia messaging service signal (MMSS) **20** containing the MMS **12** to the receiving terminal **22**, and the latter renders the MMS **12**, and the rendered multimedia message **28** is perceived by the user **24**. If, on the other hand the receiving terminal **22** does not support all of the components of the MMS **12**, the MMSC **14** decides if it is more appropriate to adapt the unsupported

25   components to the existing receiving terminal **22** capabilities (through quality reduction, image resolution reduction, format conversion, etc.), or to provide information to the receiving terminal **22** about the location of software that would allow it to support those components, or to do both (e.g. convert to a format that is not supported by the terminal, giving a better user experience compared to converting to a

30   supported format, and for which software exists for the terminal to render it). The first case is what typically happens today. In the second case, the MMSC **14** uses its database **14a** to identify one or more uniform resource locators (URLs) for the additional software needed to be installed in the receiving terminal **22** for rendering the originally unsupported components of the MMS **12**. The database **14a** can be

organized in many ways. One way is to provide it with USER-AGENT header (providing terminal model and software release) and MIME type and it returns the URL of the software available to render such MIME type for the terminal associated with the given USER-AGENT. The database **14a** can return many URLs if for

5 instance many software alternatives exist (e.g. from different vendors). Note that the terminal capability information can be contained not only in the MRRS **18** but can also come from other sources such as a user profile database which can be a part of the MMSC **14** (or external). The MMSS **20** sent by the MMSC **14** to the receiving terminal **22** contains both the adapted version of the MMS **12** (a further multimedia

10 message signal, FMMS, indicative of the multimedia message) and a URL signal for each software needed to render the message. The location of the URL signal in the MMSS **20** is an implementation detail. It can be a part of a message text component (e.g. Info text) or it can be a part of a header. Note also that the MMSS **20** can contain many URLs per MIME type.

15 Furthermore, a decision is made whether to download and install software to the receiving terminal **22** for rendering the originally unsupported components of the MMS **12**. This decision can be made automatically by the receiving terminal **22** followed by sending a software request signal **34** based on the software location information contained in the URL signal to an Internet server **32** and subsequently,

20 receiving **36** and installing the requested software. This decision can be also made by the user **24** after analyzing a URL image signal **26** displayed by the receiving terminal **22** or the download conditions provided by the Internet server **32** (e.g. cost of downloading the software). Especially, when multiple URLs are offered per MIME type, the user **24** decision is important as he can select the best software based on cost,

25 memory footprint, reputation of the company providing the software, etc.. If the user **24** decides to install the software, the user **24** sends a software request command **30** to the receiving terminal **22**, followed by sending the software request signal **34** based on the software location information contained in the URL signal to the Internet server **32** and subsequently, receiving **36** and installing the requested software by the

30 receiving terminal **22**. The receiving terminal **22** renders the adapted version of MMS **12** (FMMS) indicative of the multimedia message, generally comprising originally supported components, adapted components (per prior art), adapted components still unsupported (with URLs available), originally unsupported components (with URLs available), and possibly originally unsupported components (without URL). Thus, the

supported components of the multimedia message including originally supported and adapted components and originally unsupported components for which the additional software installed using URLs, are perceived by the user **24**.

Figure 1 illustrates only one scenario for implementation of a system described in the present invention. A number of variations and further developments are possible. For example, the MMSC **14** can have an extensive user profile database **14a** containing detailed information about the receiving terminal **22** capabilities and corresponding MIME information, so it can identify the URL information for the software needed to be installed in the receiving terminal **22** for rendering the originally unsupported components of the MMS **12**. In that case the MMSS **20** containing both the FMMS (adapted version of MMS **12**) and the URL signal can, depending on the specific service protocol, be sent by the MMSC **14** to the receiving terminal **22** without previously sending the message notification signal **16** to the receiving terminal **22** and receiving the MRRS **18** from the receiving terminal **22**. That would typically be the case in SIP Instant Messaging (IETF SIMPLE specification) where the terminal capabilities could be known from the registration of the terminal to its registrar. At registration, the terminal would provide USER-AGENT information in addition to other terminal capabilities. The SIP adaptation and inclusion of URLs could be performed in a SIP proxy which would perform the role of the MMSC **14** of Figure 1.

Figure 2 shows a flow chart further illustrating a system performance. In a method according to the present invention, in one possible scenario, in a first step **40**, a sending terminal **10** sends the multimedia message signal (MMS) **12** indicative of a multimedia message (MM) to the multimedia messaging service center (MMSC) **14**. In a next step **42**, the MMSC **14** receives the MMS **12** and can store it. In a next step **44**, the MMSC **14** provides the message notification signal **16** to the receiving terminal **22**. Step **44** can be skipped in certain situations, for example, for e-mail messages. In a next step **46**, the receiving terminal **22** provides the MRRS **18** containing the terminal and MIME information to the MMSC **14**. Again, depending on the specific service, this step can be skipped such as in the case of SIP Instant Messaging (for this service, this step of providing terminal capabilities can be achieved during the registration process). In a next step **48**, MMSC **14** evaluates if it is appropriate to adapt the unsupported components (one or more) of the MMS **12** to meet the capabilities of the receiving terminal **22** and using its database **14a** identifies

URLs to software, which if downloaded to the receiving terminal **22** will allow the unsupported components of the MMS **12** to be rendered by the receiving terminal **22**. Based on evaluation of the step **48**, in a next step **49**, the MMSC **14** adapts the MMS **12** by adapting the appropriate unsupported components of the MMS **12** transforming these components to meet capabilities of the receiving terminal **22**. Said adapted MMS **12** is a further multimedia message signal (FMMS) indicative of the original multimedia message. The adaptation process can also include transforming unsupported components to formats still unsupported by the receiving terminal **22** but for which software is available for its proper rendering and for which URLs to such software exist. In a next step **50**, it is ascertained by the MMSC **14** whether the receiving terminal **22** requires additional software for rendering the unsupported components of the FMMS. As long as no extra software is required, the MMSC **14** in a next step **52** sends the multimedia messaging service signal (MMSS) **20** containing the FMMS generated in the step **49** to the receiving terminal **22**, and in a next step **62**, the receiving terminal **22** renders and presents **28** the FMMS and the multimedia message is perceived by the user **24**. However, if it is ascertained by the MMSC **14** that the receiving terminal **22** requires additional software for rendering the unsupported components of the FMMS, in a next step **54**, the MMSC **14** sends the MMSS **20** containing the FMMS generated in the step **49** and the URL signal determined in the step **48** to the receiving terminal **22**. In a next step **56**, it is ascertained whether the additional software is wanted or needed to be installed in the receiving terminal **22** for rendering the unsupported components of the MMS **12**. As long as that is not the case, in a next step **62**, the receiving terminal **22** renders the supported components of the FMMS and information provided **28** by the supported components of the multimedia message is perceived by the user **24**. If it is decided that additional software is required, in a next step **58**, a request signal is provided on a line **34** from the receiving terminal **22** to the Internet server **32** and additional software is downloaded on a line **36** from the Internet server **32** to the receiving terminal **22**. The receiving terminal **22** receives and installs the requested software as shown in a next step **60** following the software downloaded signal **36** sent to the receiving terminal **22** from the Internet server **32**. Finally, in a step **62**, the receiving terminal **22** renders the FMMS supported by the originally available or just installed software in the receiving terminal **22** and thus, the supported components (supported

components and unsupported components for which the additional software installed using the URLs) of the multimedia message are perceived **28** by the user **24**.

It should be realized that many variations of the above-described methodology are possible. For instance, the step **54** shown in Figure 2 could be broken down into

5   two steps where the MSS and URL signals are sent separately or where the ordering of the illustrated steps is altered. Thus, the signal on the line **20** should be understood in that sense. Another example of variation is when the MMSC is a Web server. In that case, there is no sending terminal **10**. The MMS **12** is a multimedia content (e.g. a Web page) stored in the MMSC **14**. The receiving terminal **22** sends the message

10   retrieval request signal **18** to the MMSC **14** to obtain the multimedia content. The MMSC **14**, realizing that the terminal cannot support all components of the multimedia content but that terminal-specific software exist for solving the problem, sends the MMSS **20** containing the multimedia content and the URL signal supporting said software.

15   Finally, the adaptation of the multimedia message does not need to take place in the MMSC **14** but can be performed in a separate server to which the MMSC requests message adaptation to be performed including inclusion of the earlier described URLs. Furthermore, in general the receiving terminal 22 can receive the MMSS 20 containing the FMMS and the URL signal from a different server and not

20   necessarily form the MMSC 14.